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Integrating Local Cultural Heritage into Early Childhood Education through Role-Playing Games: A Quasi-Experimental Study on Rendang Literacy

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Abstract

This study aims to evaluate the effectiveness of Role Playing Game (RPG) media in enhancing Minangkabau natural cultural literacy among early childhood learners at TK Al Hidayah Tabing Padang. A quasi-experimental method employing a nonequivalent control group design was used, involving 20 children aged 5–6 years who were assigned to experimental and control groups. Data were collected through observation and analyzed using SPSS 25.0, with tests for normality, homogeneity, and independent sample t-tests. The results revealed a significant difference in cultural literacy between the experimental and control groups, with a p-value of 0.000 < 0.05 and a Cohen's d value of 2.96, indicating a very large effect size. These findings confirm that RPG media is highly effective in promoting cultural literacy in early childhood. This study contributes to the development of culturally responsive education and suggests the integration of RPG-based learning into early childhood curricula as a practical strategy for preserving regional cultural heritage from an early age.

Keywords: *early childhood; Minangkabau natural cultural literacy; role playing game.*

Abstrak

Penelitian ini bertujuan untuk mengetahui efektivitas media Role Playing Game (RPG) dalam meningkatkan literasi budaya alam Minangkabau pada anak usia dini di TK Al Hidayah Tabing Padang. Penelitian menggunakan desain kuasi eksperimen dengan jenis nonequivalent control group design. Subjek penelitian berjumlah 20 anak usia 5–6 tahun yang dibagi ke dalam kelas eksperimen dan kelas kontrol. Teknik pengumpulan data dilakukan melalui observasi, dan data dianalisis menggunakan SPSS 25.0 melalui uji normalitas, homogenitas, dan uji-t sampel independen. Hasil penelitian menunjukkan adanya perbedaan signifikan antara kelas eksperimen dan kontrol dalam hal literasi budaya, dengan nilai signifikansi p = 0,000 < 0,05 dan nilai efektivitas Cohen's d = 2,96 yang menunjukkan kategori efek sangat tinggi. Temuan ini membuktikan bahwa media RPG sangat efektif dalam menumbuhkan literasi budaya pada anak usia dini. Penelitian ini memberikan kontribusi terhadap pengembangan pembelajaran berbasis budaya lokal dan merekomendasikan penggunaan RPG sebagai pendekatan praktis dalam kurikulum PAUD untuk melestarikan budaya daerah sejak usia dini.

Kata Kunci: *anak usia dini; literasi budaya alam Minangkabau; role playing game.*

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Introduction

The development of literacy is a crucial component of early childhood education. According to Eliza (2019), children's literacy starts at birth and keeps up as they mature. But according to Hanushek, the PISA test results indicate that Indonesia is among the emerging nations with the most severe literacy issues (Christianti, 2024). The literacy rate among Indonesian children is currently low. According to the PISA 2022 findings, Indonesia is now ranked higher than it was in 2018. The average score for Indonesia has, however, dropped, specifically in the areas of science literacy (from 396 to 383), mathematics literacy (from 379 to 366), and reading literacy (from 371 to 359). With a total score of 1,108, Indonesia is placed 69th out of 81 nations (Idil et al., 2024).

Early literacy instruction is crucial because it can aid in the development of young children's comprehension and analytical skills (Choiriyah et al., 2023). Furthermore, literacy stimulation is crucial because, according to Montessori, children are in their golden years, when their brains are like sponges that take in all that is presented to them (Solichah et al., 2022). Basic literacy, language literacy, numeracy literacy, digital literacy, science literacy, and cultural literacy are all generally included in early childhood literacy (Nurhayani & Nurhafizah, 2022). Cultural literacy is one of the literacy skills that young children should be taught (Damayanti, 2024; Maryono et al., 2022; Lähdesmäki et al. 2021).

One of the crucial literacies taught to young children is cultural literacy. Cultural literacy should be taught to Indonesian children from a young age as a fundamental literacy skill (Kemdikbud, 2017). In order for children to comprehend the surrounding context, cultivate critical thinking abilities, and acquire understanding of both their own and other cultures, they must be exposed to local culture (Eliza, 2017).

Preserving local culture is a significant difficulty in the field of education, particularly at the Early Childhood Education (PAUD) level, given the current state of globalization and the advancement of digital technologies. Since early infancy is a crucial time in the development of identity, character, and an awareness of cultural values, it is crucial to introduce children to culture at a young age (İslamoğlu, 2018; Latifa et al., 2023; Rohita et al., 2021). Traditional cuisine serves as both a cultural legacy and a tool for teaching values and skills, making it a valuable way to promote cultural literacy. Rendang, a traditional Minangkabau food that is full of philosophical values and complex processing techniques, is a potential medium for introducing local culture in a fun and meaningful way to children (Putra & Eliza, 2023).

In the 4.0 era, information, technology, and knowledge are developing very rapidly. This has an impact on the ease of access to information, allowing the entry of foreign cultures that are not in accordance with local cultural values. Children become more aware of foreign cultures because of the large amount of information available from the gadgets they use (Triwardhani et al., 2023). This situation, although a challenge, can also be used to support the development of cultural literacy about traditional Minangkabau food. Because based on research (Wahyuni & Eliza, 2022) the learning process of introducing local culture that takes place in schools is still carried out using the lecture method in front of the class without any concrete media.

Various previous studies have shown that interactive digital learning media can increase children's involvement in the learning process (Rulismi et al., 2022; Ul et al., 2024; Sulistyawati et al., 2024), as well as foster their interest in local culture. For example, a study (Syafdaningsih & Pratiwi, 2022) stated that the use of digital media based on folklore can significantly increase the understanding of local culture in early childhood. However, most of these approaches are still passive, without directly involving children in cultural learning experiences. This shows a gap in the delivery of cultural values actively and contextually.

To address this gap, this study offers innovative media in the form of utilizing Role Playing Games (RPG) as a digital learning environment. Through RPG, children not only become recipients of information, but also actors in cultural simulations (Mutoharoh & Anfasya, 2025), such as cooking and serving rendang digitally. In this process, children are trained to develop comprehensive cultural skills, including: identifying rendang ingredients, distinguishing types of ingredients, following cooking instructions in sequence, processing rendang from raw to cooked ingredients, re-

explaining the process, choosing appropriate serving tools, and sequencing the serving steps correctly.

This research supports the direction of digitalization of cultural learning, but at the same time corrects the lack of active participation of children in previous approaches. By combining RPG technology and local cultural context, this research encourages adaptive, meaningful, and relevant learning. This innovation not only enriches PAUD learning, but also strengthens children's cultural literacy towards Minangkabau local wisdom.

This study offers a new approach through the use of Role Playing Game (RPG) media to introduce traditional Minangkabau food, namely rendang, as part of cultural literacy. RPG is a media that allows children to learn through interactive, explorative, and fun role simulations. Although RPG has been widely used in learning at higher levels, studies that integrate digital RPG into cultural literacy learning in PAUD are still very limited. Therefore, this study explicitly aims to fill this gap and become one of the few studies that apply digital RPG media as a means of learning cultural literacy in early childhood in the context of traditional food, with a quasi-experimental approach. This novelty is an important contribution to the development of local culture-based learning strategies that are relevant to the needs of the times.

As a solution, this study uses RPG specifically designed to introduce the process of cooking rendang interactively, so that children not only know the name of traditional food, but also understand the process and cultural values. The results of this study are expected to be an innovative contribution in the development of local culture-based learning media that are in accordance with the needs and characteristics of early childhood in the digital era.

Methodology

This study uses a quantitative approach with a quasi-experimental design of the Nonequivalent Control Group Design type. The subjects of the study consisted of two classes of group B at TK Al Hidayah Tabing Padang, each with 10 children; class B1 as a group and class B2 as a control group. The sampling technique was carried out by purposive sampling based on the homogeneity of age, ability, and learning facilities. Data were collected through pre-test and post-test using an instrument based on seven indicators of Minangkabau traditional food culture literacy that had been validated by experts.

Table 1. Research Instrument Of Early Childhood Cultural Literacy Skills About Minangkabau Traditional Food

No	Aspect	Assessment Criteria			
		BB	L	C	M
1	Identifying ingredients used in making rendang				
2	Explaining the differences in types of ingredients used in making rendang				
3	Following rendang cooking instructions in the correct order				
4	Processing rendang from processing to rendang				
5	Re-explaining the rendang making process				
6	Choosing the right rendang serving tools				
7	Sequencing rendang serving steps				

Source: (Elida, 2014).

The research instrument has been validated by experts, and the validity test and reliability test of Alpha Cronbach were 0.895. This digital Role Playing Game (RPG) learning media was developed by researchers together with a graphic designer and validated to ensure that the content, visuals, and gameplay reflect local cultural values authentically. The content validation process was carried out through discussions with local PAUD lecturers. This game contains a simulation of the

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rendang cooking process that is adjusted to the local cultural context and child development, so that it can support interactive and meaningful cultural literacy learning. The treatment was given three times, with RPG as a learning medium in the experimental class developed by the researcher according to the RPP, while the control class followed conventional learning by the teacher. Data were analyzed using normality tests (Liliefors), homogeneity (one-way ANOVA), and independent t-tests to measure the significance of the influence of RPG on improving cultural literacy, with the help of SPSS 25.0. The effect of the treatment was also measured through the effect size test to determine the magnitude of the impact of the treatment.

Results and Discussion

The data described in this study consists of experimental class data and control class data. Each class underwent a pre-test (initial ability test) before being given treatment. The level of Minangkabau natural culture literacy of early childhood was measured through observation, and tests (written and oral) according to the research instrument, both in the experimental class and the control class. Measurements were taken to determine the extent of the Minangkabau natural culture literacy ability of early childhood and to be used as a comparison with the results of the post-test that the researcher will conduct. Table 2 are the pre-test and post-test results from the experimental and control classes:

Table 2. Recapitulation of the Pre-test Results of the Introduction to Minangkabau Natural Cultural Literacy in the Experimental Class and Control Class

Statistics			Statistics
Pre-test Eksperimen			*Pre-test* Kontrol
N	Valid	10	10
	Missing	0	0
Mean		12.0000	12.9000
Std. Deviation		1.76383	1.44914
Minimum		10.00	11.00
Maximum		15.00	15.00
Sum		120.00	129.00

Table 3. Recapitulation of Post-test Results of Introduction to Minangkabau Natural Cultural Literacy in Experimental Class and Control Class

Statistics			Statistics
Post-test Eksperimen			*Post-test* Kontrol
N	Valid	10	10
	Missing	0	0
Mean		19.9000	15.6000
Std. Deviation		2.76687	1.57762
Minimum		16.00	14.00
Maximum		24.00	18.00
Sum		199.00	156.00
a. Multiple modes exist. The smallest value is shown			

The pre-test results showed that both groups had relatively balanced initial abilities. The average pre-test score of the experimental group was 12.00 (SD = 1.76), while the control group was 12.90 (SD = 1.45). After the treatment, the post-test results showed an increase in cultural literacy skills in both groups, but the increase in the experimental group was more significant. The average post-test of the experimental group was 19.90 (SD = 2.77), while the control group only reached 15.60 (SD = 1.58).

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Next, data analysis is carried out with the aim of obtaining valid research results by going through various stages. In order to be able to conduct a hypothesis test using the t-test, an analysis requirement test is first carried out with a normality test and a homogeneity test on the test results to determine whether the data from the variables studied are normally distributed and homogeneous. The following are the stages of testing the research data results carried out:

Normality test

Table 4. Normality Test Of Experimental and Control Pre-Test

Tests of Normality

	Kolmogorov-Smirnov^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Pretest Eksperimen	.172	10	.200*	.919	10	.350
Pretest Kontrol	.172	10	.200*	.917	10	.330

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Table 5. Post-Test Normality Test Of Experiment And Control

Tests of Normality

	Kolmogorov-Smirnov^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Post-test Eksperimen	.169	10	.200*	.939	10	.543
Post-test Kontrol	.248	10	.082	.855	10	.067

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Based on the table above, the Shapiro-Wilk sig value for the pre-test experiment and control is 0.350 and 0.330 > 0.05, so the data is stated to be normally distributed. Furthermore, the Shapiro-Wilk sig value for the post-test experiment and control is 0.543 and 0.067 > 0.05, so the data is stated to be normally distributed.

Homogeneity test

Table 6. Homogeneity Test Of Pre-Test Experiment And Control

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Hasil Belajar Anak	Based on Mean	.478	1	18	.498
	Based on Median	.529	1	18	.476
	Based on Median and with adjusted df	.529	1	17.829	.476
	Based on trimmed mean	.521	1	18	.480

Table 7. Homogeneity Test Of Post-Test Of Experimental And Control Classes

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Hasil Belajar Anak	Based on Mean	4.121	1	18	.057
	Based on Median	3.729	1	18	.069
	Based on Median and with adjusted df	3.729	1	17.271	.070
	Based on trimmed mean	4.145	1	18	.057

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The table above shows that the significance value of the pre-test is 0.498 and the post-test is 0.057. Because the significance value is more than 0.05, the pre-test and post-test data of the experimental and control classes are declared homogeneous.

Hypothesis testing (t-test)

Table 8. Independent Samples Test Pre-Test Experiment and Control

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar Anak	Equal variances assumed	.478	.498	-1.247	18	.228	-.900	.722	-2.417	.617
	Equal variances not assumed			-1.247	17.347	.229	-.900	.722	-2.421	.621

Table 9. Independent Samples Test Post-Test Experiment And Control

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar Anak	Equal variances assumed	4.121	.057	4.269	18	.000	4.30000	1.00720	2.18396	6.41604
	Equal variances not assumed			4.269	14.293	.001	4.30000	1.00720	2.14392	6.45608

The independent t-test showed no significant difference between the two before treatment ($p = 0.228 > 0.05$), so it can be concluded that both are equivalent in initial ability. While after treatment the t-test showed a significant difference ($p = 0.000 < 0.05$), so RPG was proven to have a significant effect on increasing cultural literacy. The magnitude of the influence of RPG can be seen in the following Cohen's d test:

$d = (M1-M2) / SDpooled$
$SDpooled = \sqrt{[(SD1^2 + SD2^2)/2]}$
Dimana: M1=Mean kelas eksperimen, M2=Mean kelas kontrol, SD1=Standar Deviasi kelas eksperimen, SD2=Standar Deviasi kelas kontrol.
M1=19,9, M2=15,6, SD1=2,76687, SD2= 1,57762
$d = (19,9 - 15,6) / \sqrt{[(2,76687^2 + 1,57762^2) / 2]}$
$d = 4,3/2.252 = 1,909$

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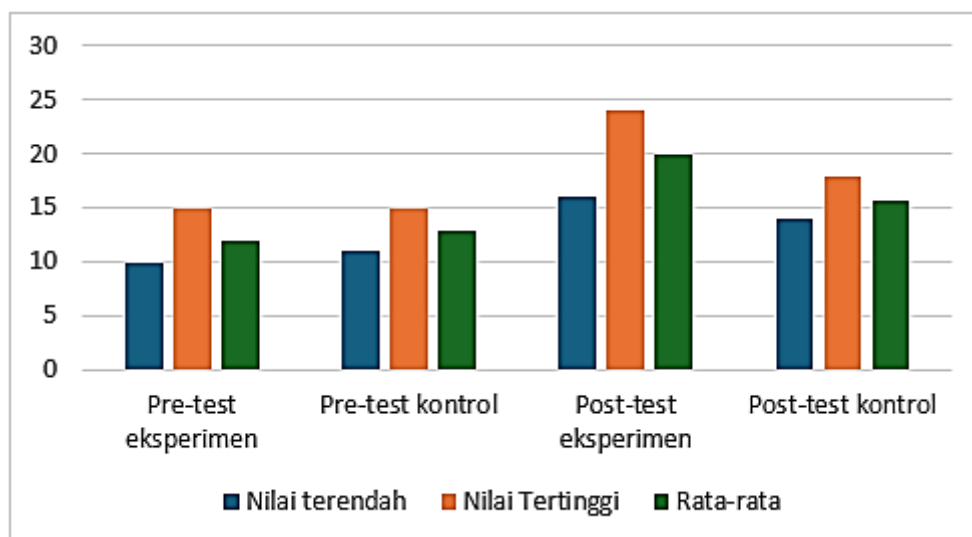
The calculation of effect size using the Cohen's d formula produces a value of 1.909, which indicates that the influence of RPG is in the very high category, with an influence contribution of 97.1%.

The results of the calculation of pre-test and post-test scores can be seen in the following graph 1:

Graph 1. Comparison of Pre-test and Post-test Data on Natural Culture Literacy in Early Childhood

Graph 1 above shows that the Minangkabau natural cultural literacy ability of children in the experimental class is more successful than the control class because the experimental class obtained an average score of 19.9, while the control class was 15.6. So it can be concluded that role playing games have an effect on the Minangkabau natural cultural literacy of early childhood children.

Based on the results of the researcher's research, the children were able to identify the ingredients used in making rendang, explain the differences in the types of ingredients used in making rendang, follow the instructions for cooking rendang in the correct order, process the making of rendang from processing to becoming rendang, explain the process of making rendang again, choose the right rendang serving tools, and sequence the steps for serving rendang after using the role playing game.

Discussion

The study's findings indicate that the use of role-playing games (RPGs) has a significant impact on children's literacy development, particularly when it comes to traditional Minangkabau cuisine, such as rendang (Zulfitrah, 2020). Children that participate in RPG-based learning demonstrate greater comprehension of the following indicators of Literasi Budaya alam Minangkabau in this study:

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Figure 1. Role Playing Game

Identifying the ingredients used in making rendang

In the RPG game, children will know the ingredients for making rendang after dragging the ingredients into the pan. After this activity, children are required to recognize and choose the appropriate ingredients through a worksheet containing rendang ingredients and other ingredients, thereby strengthening the visual and functional identification skills of the ingredients. This is in line with Brunner's opinion (Gombo, 2024) which states that children learn best in the enactive representation stage, namely through direct action. Drag-and-drop (dragging ingredients into the pan) is a form of digital enactive representation that allows children to learn through concrete actions.

Explaining the differences in the types of ingredients used in making rendang

When the quiz is given, children recall the differences in rendang ingredients that come from flora and fauna. This is in line with Piaget's theory which states that at the pre-operational stage (ages 5–6 years), children begin to be able to classify objects (Indriyani & Sobandi, 2024). With RPG, children experience this classification process interactively—through trial and error that encourages cognitive development.

Following the instructions for cooking rendang in the correct order

The game provides cooking instructions in stages, and the child must follow the order: dragging the coconut milk first, then the ground spices, etc. If the order is wrong, the system provides feedback or re-instructions. This builds the child's procedural understanding. This is in line with Vygotsky's opinion, children learn best in the zone of proximal development when accompanied or assisted through scaffolding (Lasmawan & Budiarta, 2020). The game acts as a digital scaffolding by providing gradual directions, strengthening the ability to follow instructions sequentially.

Processing of rendang from processing to rendang

The entire process from cooking to serving. RPG provides a comprehensive simulation, so that children understand the integrated series of processes, not just separate parts. Dewey stated that "learning by doing" allows for deeper understanding (Abuzandah, 2020). The entire process in the game shows the transformation of raw materials into cooked rendang, providing a holistic and contextual learning experience.

Re-explaining the process of making rendang

After cooking, children take a quiz or are asked again about the steps they took. Because they have experienced the process directly, they tend to be able to explain it again in their own words.

Ausubel in (Bryce & Blown, 2024) emphasizes the importance of meaningful learning, which is learning that is associated with real experiences. The experience of playing cooking rendang makes it easier for children to remember and re-explain the process in sequence.

Choosing the right rendang serving tool

In the final stage of the game, children choose serving tools such as plates, leaves, or spoons. Their choices are judged right or wrong according to the Minangkabau cultural context. This introduces serving norms in local culture. This is in line with Gardner in (MEHIRI, 2020), children have visual-spatial and naturalistic intelligence that can be honed through the activity of choosing tools and materials contextually. This game involves both of these intelligences to introduce aesthetic and cultural values.

Sequencing the steps of serving rendang

Children are asked to sequence the steps of serving through a quiz or mini-game feature (e.g. drag-and-drop images into the correct order). This activity trains logical and sequential thinking skills, while strengthening cultural understanding. Montessori teaches the importance of order and routine in developing children's logical thinking (Ön Hallumoğlu et al., 2023). Game features that require sequencing steps strengthen children's sequential abilities naturally.

The above findings are in line with research by (Hilmawan & Yuniati, 2024) which shows that RPGs can improve literacy and learning engagement in early childhood because they provide space for exploration through the roles played by children (Jantke & Hume, 2015; Mahardika et al., 2023; Nugroho et al., 2021; A. C. Putra, 2018). By adopting RPGs, teachers can use innovative approaches in local culture-based learning. Role-playing games can be used as one of the learning media because they are considered capable of improving the literacy skills of Minangkabau natural culture in early childhood. The use of RPGs as a learning medium is a new innovation in the use of increasingly developing technology. Adopting RPGs in learning is very relevant because it allows children to explore cultural values actively and contextually (Ruiz-Ezquerro, 2021; Winarno et al., 2022; Winardy & Septiana, 2023).

The results of this study contribute to the modification of early childhood learning theories based on local culture which were previously mostly carried out with a passive approach (such as lectures or image visualization). This study shows that the use of digital-interactive media based on culture can increase the effectiveness of learning and child engagement (Teichert et al., 2021; Maulinda et al., 2024). Thus, this finding has the importance of developing PAUD learning media that integrate technology and local wisdom simultaneously.

Furthermore, this study proposes the need for integration of local culture in the design of digital-based curriculum in early childhood education. This not only enriches children's insight into their cultural identity, but also equips them with 21st-century skills through interactive technology-based media that are relevant to the context of children's lives.

Conclusions

This study concludes that the use of digital-based Role Playing Game (RPG) media has a significant influence on increasing cultural literacy of early childhood, especially in introducing traditional Minangkabau food, namely rendang. The results of the statistical test showed a sig significance value (2-tailed) of 0.000 <0.05, which means that H0 is rejected and Ha is accepted. Thus, the use of role playing games is proven to be more effective than image media in increasing cultural literacy of early childhood Minangkabau. The magnitude of this influence is reinforced by the effect size value based on the Cohen's d test which reached 97.1%, indicating that its influence is included in the very high category.

Through RPG, children can be directly involved in active, contextual and fun learning, so that their understanding of local culture increases significantly. Further development prospects can be directed at the integration of RPG media with various cultural themes in other regions in Indonesia, as well as the application of this media on a wider scale and in various educational

contexts. In addition, further research can explore the influence of RPGs on other aspects of development such as language literacy, numeracy, and early childhood character.

However, this study has limitations, such as a small sample size and a scope limited to one educational institution, so that the results cannot be generalized widely. In addition, the focus of the study is still limited to cognitive aspects (cultural literacy), without exploring the influence of RPGs on non-cognitive development aspects such as social-emotional, creativity, or cultural tolerance attitudes. Therefore, it is recommended that further research use larger samples, across cultural regions, and cover broader dimensions of child development. Further research can also develop other local culture-based RPGs to enrich educational content based on local wisdom and interactive technology.

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